

-22-

## CLAIMS:

1. A method of acquiring chemical information with a mass spectrometer having (i) a first ionization source for creating ions, (ii) a second ionization source for creating ions, (iii) a first detector for detecting ions, and (iv) a second detector for detecting ions, comprising:
  - (a) simultaneously sampling ions created by said first ionization source and said second ionization source so as to produce a first ion sample and a second ion sample; and
  - (b) simultaneously detecting ions from said first ion sample with said first detector and ions from said second ion sample with said second ion detector.
2. A spectrometer including apparatus for coupling at least two different ion streams simultaneously to the spectrometer from at least two different ion sources.
3. The apparatus of claim 2 wherein the spectrometer comprises a time-of-flight mass spectrometer.
4. The apparatus of claim 3 wherein one of the at least two different ion sources comprises an electrospray ionization source.
5. The apparatus of claim 4 wherein one of the at least two different ion sources comprises an inductively coupled plasma source.
6. The apparatus of claim 2 wherein one of the at least two different ion sources comprises an electrospray ionization source.
7. The apparatus of claim 6 wherein one of the at least two different ion sources comprises an inductively coupled plasma source.
8. The apparatus of claim 3 wherein one of the at least two different ion sources comprises an inductively coupled plasma source.
9. The apparatus of claim 8 wherein one of the at least two different ion sources comprises an electron-impact ionization apparatus.
10. The apparatus of claim 2 wherein one of the at least two different ion sources comprises an inductively coupled plasma source.
11. The apparatus of claim 10 wherein one of the at least two different ion sources comprises an electron-impact ionization apparatus.

-23-

12. The apparatus of claim 2 wherein one of the at least two different ion sources comprises an electron-impact ionization apparatus.

13. The apparatus of claim 3 wherein one of the at least two different ion sources comprises an electron-impact ionization apparatus.

5 14. The apparatus of claim 2 wherein one of the at least two different ion sources comprises a matrix-assisted laser desorption ionization apparatus.

10 15. The apparatus of claim 3 wherein one of the at least two different ion sources comprises a matrix-assisted laser desorption ionization apparatus.

16. A method of operating a spectrometer including providing at least two different ion sources, and coupling ion streams simultaneously from the at least two different ion sources to the spectrometer.

15 17. The method of operating a spectrometer according to claim 16 comprising a method of operating a time-of-flight mass spectrometer.

18. The method of claim 17 wherein providing at least two different ion sources comprises providing an electrospray ionization source.

19. The method of claim 18 wherein providing at least two different ion sources comprises providing an inductively coupled plasma source.

20 20. The method of claim 16 wherein providing at least two different ion sources comprises providing an electrospray ionization source.

21. The method of claim 20 wherein providing at least two different ion sources comprises providing an inductively coupled plasma source.

25 22. The method of claim 17 wherein providing at least two different ion sources comprises providing an inductively coupled plasma source.

23. The method of claim 22 wherein providing at least two different ion sources comprises providing an electron-impact ionization apparatus.

24. The method of claim 16 wherein providing at least two different ion sources comprises providing an inductively coupled plasma source.

30 25. The method of claim 24 wherein providing at least two different ion sources comprises providing an electron-impact ionization apparatus.

26. The method of claim 16 wherein providing at least two different ion sources comprises providing an electron-impact ionization apparatus.

-24-

27. The method of claim 17 wherein providing at least two different ion sources comprises providing an electron-impact ionization apparatus.

28. The method of claim 14 wherein providing at least two different ion sources comprises providing a matrix-assisted laser desorption ionization apparatus.

29. The method of claim 15 wherein providing at least two different ion sources comprises providing a matrix-assisted laser desorption ionization apparatus.

30. A method of operating a spectrometer including providing at least two different ion sources, first coupling an ion stream from a first one of said ion sources into the spectrometer, next coupling an ion stream from a second one of said ion sources into the spectrometer, next coupling an ion stream from the second one of said ion sources into the spectrometer, and next coupling an ion stream from the first one of said ion sources into the spectrometer.

31. The method of operating a spectrometer according to claim 30 comprising a method of operating a time-of-flight mass spectrometer.

32. The method of claim 31 further including developing mass spectra from the coupling of ion streams from said second one of said ion sources into the spectrometer while coupling an ion stream from the first one of said ion sources into the spectrometer.

33. The method of claim 32 wherein coupling an ion stream from the first one of said ion sources into the spectrometer comprises coupling an ion stream from an electrospray ionization source into the spectrometer.

34. The method of claim 33 wherein coupling an ion stream from the second one of said ions sources into the spectrometer comprises coupling an ion stream from an inductively coupled plasma source into the spectrometer.

35. The method of claim 30 further including developing mass spectra from the coupling of ion streams from said second one of said ion sources into the spectrometer while coupling an ion stream from the first one of said ion sources into the spectrometer.

36. The method of claim 35 wherein coupling an ion stream from the first one of said ion sources into the spectrometer comprises coupling an ion stream from an electrospray ionization source into the spectrometer.

-25-

37. The method of claim 36 wherein coupling an ion stream from the second one of said ion sources into the spectrometer comprises coupling an ion stream from an inductively coupled plasma source into the spectrometer.